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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/722,400	11/27/2000	Tianhong Zhang	MIC-58DV2	5784

7590 01/29/2003

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EXAMINER	
MOHAMEDULLA, SALEHA R	
ART UNIT	**PAPER NUMBER**
1756	

DATE MAILED: 01/29/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/722,400	ZHANG ET AL.	
	Examiner	Art Unit	
	Saleha R. Mohamedulla	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 November 2000 and 16 January 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9-12 and 27-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-12 and 27-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claims 9-12 and 27-50 are pending.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 27, 31, 32, 34, 38, 40, 44 and 46 are rejected under 35 U.S.C. 102(e) as being anticipated by US# 5,922,623 to Tsutsui et al.

Tsutsui teaches a selective vapor phase etching method. The method is characterized by comprising a step using a gas containing vapor of hydrogen fluoride to remove a silicon oxide film disposed on a semiconductor substrate having an electrode made of a high melting point metal silicide (col. 2, lines 60-67).

Tsutsui teaches subsequently depositing a buffer layer 2, channel layer 3, cap layer 5 and a silicon oxide layer 6 on a substrate (col. 4, lines 50-65). Part of the silicon oxide layer is removed, and a Schottky metal WSi and gold film 8 are deposited (col. 5, lines 5-10). Next, the silicon oxide film 6 is vapor phase-etched by gases including a vapor of hydrogen fluoride (HF), and the silicon oxide film 6 is removed as shown in Fig. 1C (col. 5, lines 14-18). Therefore, Tsutsui teaches that the WSi and Gold layers are resistant to vapor hydrogen fluoride etching as they are not etched in Fig. 1C. The WSi and Gold layers form a mask as they expose

material under the layers. The openings in the WSi and Gold layers surround the WSi/Au structure. That is, the openings exist to the left and right of the WSi/Au structure. The silicon oxide layer, under the WSi and Gold films, is able to be etched and is actually etched by vapor hydrogen fluoride. Therefore, Tsutsui teaches claim 27, 32, 34, 40 and 46 limitations. Claim 31, 38 and 44 are also rejected as the limitations are drawn to the method of making the mask and not to the structural features of the mask itself.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 33, 39 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over US# 5,922,623 to Tsutsui et al.

Tsutsui teaches the limitations discussed above in paragraph 2. Tsutsui does not teach that the opening has dimensions less than one micron. However, it would be obvious to one of ordinary skill in the art to form the opening to be less than one micron in order to form gates and other integrated circuit features having a design size less than one micron.

5. Claims 9, 11, 28, 29, 35, 36, 41, 42, 45, 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over US# 5,922,623 to Tsutsui et al. in view of US# 5,286,679 to Farnworth et al.

Tsutsui teaches or suggests the limitations discussed above in paragraphs 2 and 4. Tsutsui teaches that the mask comprises a patterned photoresist that is used to pattern the tungsten layer (col. 2, lines 10-25). Tsutsui does not specifically teach that the photoresist comprises polyimide. Farnworth teaches patterning wafer layers using a photosensitive material. The photosensitive material is exposed through a suitable mask or reticle and chemically etched in the desired pattern. Farnworth teaches suitable photosensitive materials include polyimides (col. 6, lines 50-60).

The references are analogous art as they are drawn to patterning semiconductor layers using photosensitive and etching processes. It would be obvious to one of ordinary skill in the art to use a polyimide as Farnworth teaches polyimides are commonly used in the art as photosensitive materials that pattern underlying layers on wafers.

6. Claims 9, 10, 12, 28, 30, 35, 37, 41, 43, 45, 47 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutsui et al. in view of US# 5,653,619 to Cloud et al.

Tsutsui teaches the limitations discussed above in paragraphs 2 and 4. Tsutsui does not teach that the mask comprises non-photosensitive polyimide. Cloud teaches the use of polyimide in an integrated circuit structure. Cloud teaches a suitable buffering material includes a thin layer of polyimide. It would be obvious to one of ordinary skill in the art to use Dupont PI-1111 as the material is a well-known polyimide. The nitride buffer layer 21 has the effect of enhancing the strength of the tip 13, which is one advantage of performing this optional step. The buffering layer 21 substantially impedes the etching progress into the layer on which the buffering material 21 is deposited (col. 6, lines 40-50).

The references are analogous art as they are drawn to forming gate structures for semiconductor devices. It would be obvious to one of ordinary skill in the art to use a non-photosensitive polyimide as Cloud teaches that the polyimide enhances the structure of the underlying material and prevents undesired etching of lower lying portions (col. 6, lines 35-40).

Citation of Relevant Art

7. US# 6,153,358 to Zhang et al. is cited art because it is the patent that issued from the parent application of the present application.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Saleha Mohamedulla whose telephone number is (703) 308-1260. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Mark Huff, can be reached on (703) 308-2464. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9310. The After Final fax phone number is (703) 872-9311. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

srm

January 27, 2003

MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700